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APPLICATION NUMBER: *60/084,520*
FILING DATE: *May 7, 1998*

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PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR § 1.53(c)

Express Mail label number EM083239445US Date of Deposit May 7, 1998
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR § 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, DC 20231.

Drew R. Herndon
Name of person signing

Drew R. Herndon
Signature

Docket Number	17635-762	Type a plus sign (+) inside this box →	+

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KADOSH	Arie		Tel Aviv, ISRAEL

TITLE OF THE INVENTION (280 characters max)

A SYSTEM FOR CONTROLLING COMPONENTS OF A CAR

CORRESPONDENCE ADDRESS

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ENCLOSED APPLICATION PARTS (*check all that apply*)

☒ Specification ☒ Drawing(s)	*Number of Pages* 4 *Number of Sheets* 4	☐ Small Entity Statement ☐ Other (specify)	

METHOD OF PAYMENT (check one)

☐ A check or money order is enclosed to cover the Provisional filing fees. ☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 23-2415	PROVISIONAL FILING FEE AMOUNT ($)	$150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
☐ Yes, the same of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE David J. Weitz Date: May 7, 1998

TYPED or PRINTED NAME David J. Weitz REGISTRATION NO. 38,362 (if appropriate)

☐ Additional inventors are being named on separately numbered sheets attached hereto.

PROVISIONAL APPLICATION FILING ONLY

Background of invention

Using voice recognition to command devices is a well known art but it suffers from a deteriorating recognition rates when it comes to recognition of speaker independent words since it is hard to come up with a recognizer that may recognize words spoken by different people in adverse environments. The following invention offers a solution to this problem by ffering combined handwriting and speaker dependent recognition in order to achieve high recognition credibility essential for proper work in a vehicle environment

Description of invention

The invention , referred to from now on as "smartcar" , is a device that enables the operation of systems and auxiliary devices ,intended for use in transportation vehicles, by using voice or/and handwritten commands. It combines voice recognition and handwriting recognition technology thus providing a reliable and robust method of interacting with those systems or devices.

For example in a car the smartcar may operate ,by using voice or /and handwritten commands only, devices such as cellular phone (carkit), navigation system, a PC, radio, alram system , electrical windows ,etc.
More specific uses may be voice dialing (using a name), number dialing (saying the digits or writing them), getting E-mails, operating (activating and deactivating) the alarm system using a written password, and many more. (refer to figure 1)

Principle of operation

Input commands (figure 2)

As can be seen in figure 2, The smartcar receives voice commands through a microphone. The microphone receives the human voice and transforms it to an electrical signal. This signal is then amplified and digitized. After digitization the voice recognizer utilizes processing software in order to process the command and perform recognition by comparing the command to previous pre-trained commands stored in a library which resides on a memory chip .
The voice recognition is done by the voice recognizer module and after it recognizes the command it sends it to the main program software module.
Handwritten commands are received through a touchpad connected to the smartcar. The touchpad is a device that whenever touched at a certain point it transmits the point's X and Y coordinates as a string of digital signals. A touchpad may refer to any touch sensitive device (e.g. touch screen). In the case of the touchpad the input may be done with the finger. The handwriting recognizer receives the input character or gesture or word written on the touchpad and compares it to pre-trained characters library. Once the

recognizer found a match it notifies the main program module as it is with the voice recognizer.
The library may come with pre-trained symbols (alphanumeric characters or any other gestures) already installed so the user does not have to train the recognizer to rec gnize them. Each f the symbols (either pre-trained or not), can be trained by the user to fit his or her own style.

Training

Training both recognizers means associating a spoken word or a written character to a command that is understood by one of the devices for example the gesture "arrow up" would mean closing the windows, or speaking one's name would activate the cellular phone to dial that person's number. It is essential to know the communication protocol of the devices attached to the smartcar in order to associate the command with an operation or, in case of operating the vehicle's systems such as an alarm or a window , it is essential to know the actual signal that operates these systems.
This information may be supplied by the devices manufacturers and by the cars manufacturers

Operation (figures 2,3)

The global operation of the smartcar is controlled by a switch or push button.
The smartcar has two major operation modes, which are recognition and training modes. Switching between the modes is done by the switch. For example if the user wants the smartcar to enter recognition mode he will click the switch and for now on the smartcar will accept commands – spoken or written ones. If the user wants to train the smartcar for a new command he may double-click the switch so the main program may switch to training mode.
Other global commands may be associated with the switch and which are pre-determined such as ending a conversation conducted over the cellular phone or closing an application window on the computer.

The function of the main program is to combine and coordinate the recognition modules in order to produce the proper command to the chosen device. The first command after entering the recognition mode should be the name of the device we want to communicate with. After that the main program will switch to the chosen device sending commands recognized either by the voice recognizer or the handwriting recognizer to that specific device. After the device is chosen the main program sends commands recognized by both recognizers to that device. It is the role of the main program to associate the proper device command with the recognized command given the state of the communication between the smartcar and the specific device. The user may receive a feedback from the smartcar indicating the recognized command through a loudspeaker attached to it. The same gesture or spoken command may have a different meaning interpreted by the main program depending on the device the smartcar is connected to. For example the spoken word "up" may mean "close window" if the car's system is connected but it can also mean move to radio station up scale.

The user may define, or use predefined macros (sets of commands) that may refer to more than one device attached to the smartcar. These macros may be operated regardless of the device that the smartcar is currently directed to.
For example, the user may say the command "close car" and as a result, the smartcar will close the windows, shut the radio off, shut the cellular phone off, lock the doors and activate the alarm system. All these may occur, for example, while the system expects for a radio channel voice command, or a digit to be written.

The interface module, implemented in hardware and software, is the physical module all the devices connect to through electrical connectors. It is controlled by the main program and it selects the actual lines that a command will be sent upon to the device. This module also produces the correct voltage and current needed to communicate with the devices. For example if the user communicates with a PC via RS232 protocol then translation of digital commands produced by the main program into actual +/-12 volts pulses (as required by the protocol) will be performed by the interface unit.

For example:
After a click the user may say the word "radio". The main program will now route all the recognized commands to the radio . The user may write or say (if so trained) the number "5" The main program will translate the recognized "5" to a digital command understood by the radio as "jump to station number 5" (instead of pressing the "5" on the radio itself) and send it through the interface to the radio.

In case of connecting to an alarm system of the vehicle, the user may train double passwords: voiced and handwritten as can be seen in figure 3. And only by recognizing both passwords the main program may send a command to a switch activating or deactivating the alarm system. The command may be in a form of an electrical pulse activating the switch

In case of operating a car navigation system the user may activate the proper menu of that system by voice and then enter names of streets by writing it on the touchpad.

The software may run on a CPU and the libraries may reside on memory chips such as flash memory or Eproms.

Power

The smartcar may operate on the car's voltage , connecting it to the lighter outlet, or on batteries.

References

The v ice recognizer may be utilized by ART's – (Advanced Recognition Technology Inc.) voice recognizer as described in U.S. patent application N . 08625651. Or by any other voice recognition module.
The handwriting recognizer may be utilized by ART's handwriting recognizer as described in patent applications 08528923, 08418530, 08282187, 08428806, and U.S. patent No. 5,559,633.
Reference is also made to ART's U.S. patent application 08878741.

Advantages

Combination of handwriting and voice recognition annihilates the need for speaker independent voice recognition technology, which today is hard to implement in a noisy environment.

Handwriting is not influenced by the car's noisy environment.

You can command and operate in privacy while other persons create noise.

The user may activate devices which need both voice and handwriting commands such as personal computers or cellular phones (sending short text messages).

The user may operate the devices safely while driving.

List of figures

smARTcar General Description

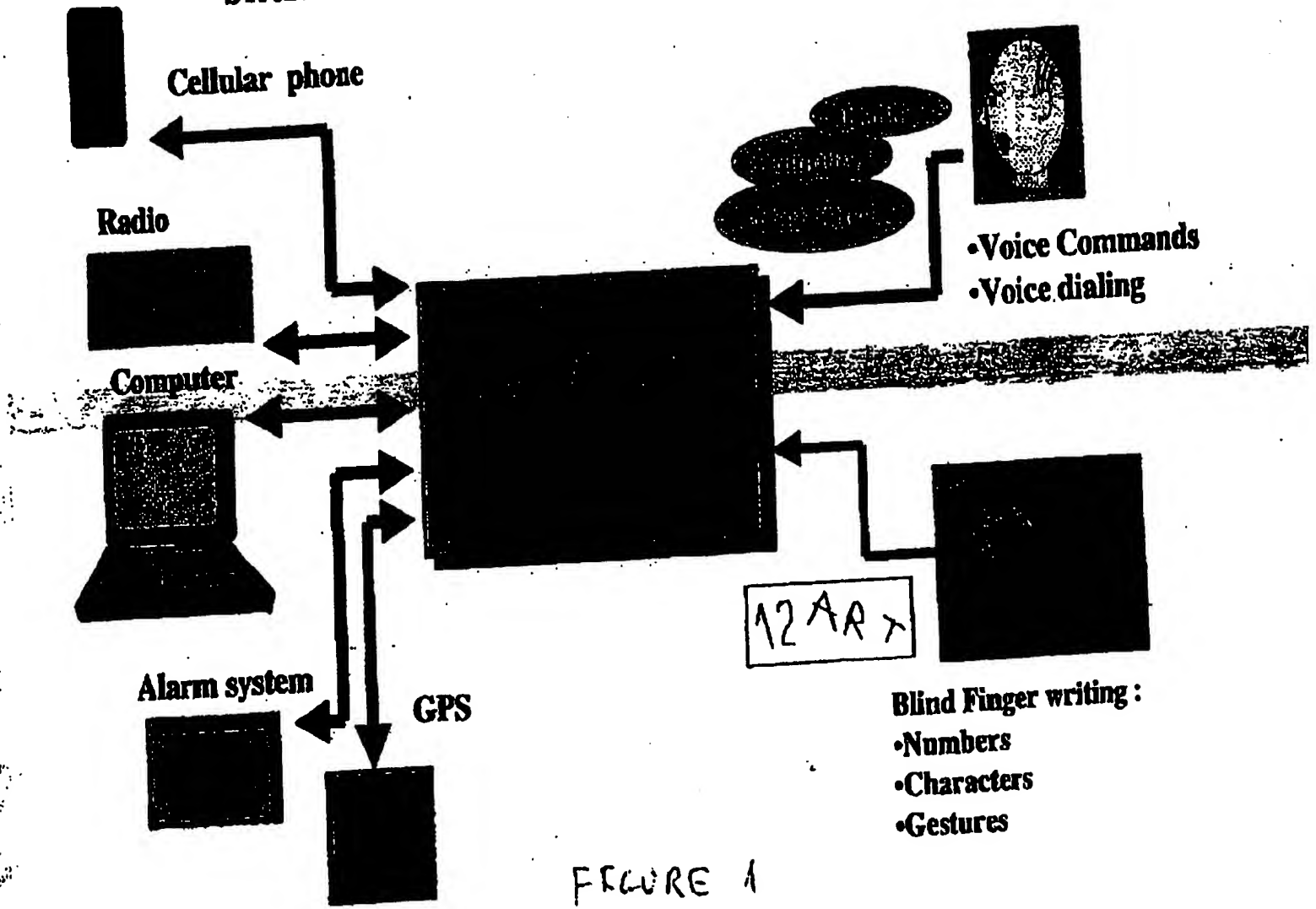

FIGURE 1

smARTcar Block Diagram

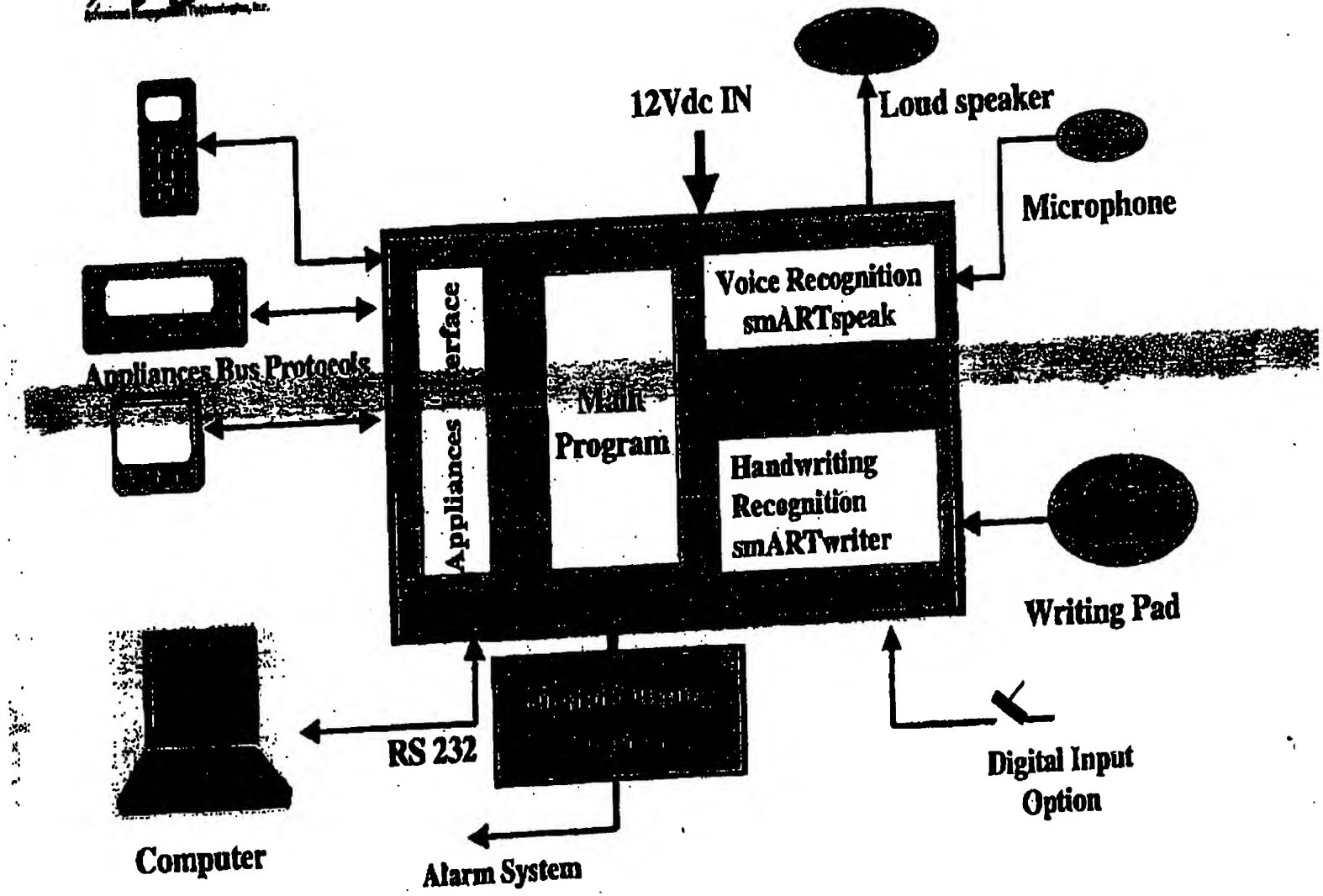

FIGURE 2

Alarm system application:

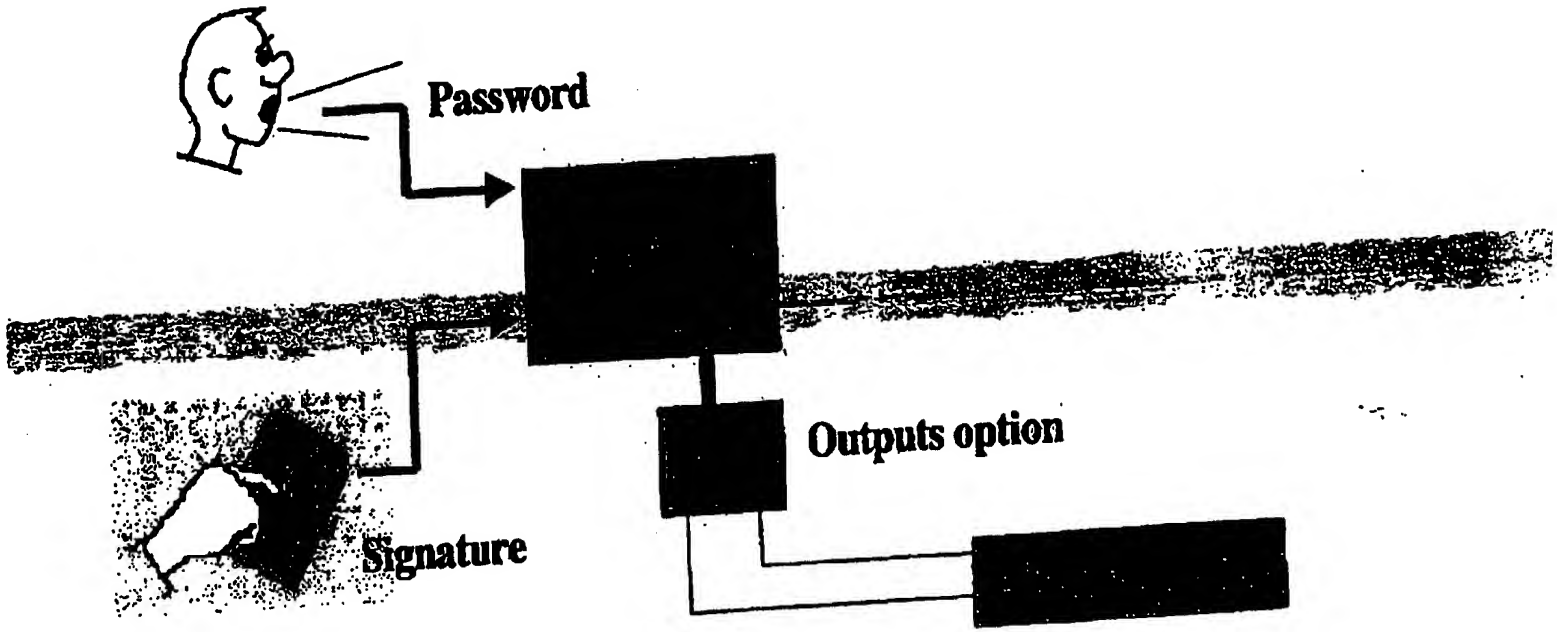

FIGURE 3.

smARTcar- Principle of Operation

SmARTcar **combines both voice and handwriting recognition technologies to become an ideal solution for car's user interface.**

[redacted]

- Trainable multi stroke handwriting technology.
- Enables to write numbers, characters, gestures with your finger
- You write blindly, without removing your eyes from the road.

Voice Recognition:

- Speaker dependent technology
- Well proven product for noisy enviro

Samsung **Motorola** **ascom** **LG**

FIGURE 4